REMARKS

Herein, the "Action" or "Office Action" refers to the Office Action dated 4/21/2004.

Applicant respectfully requests entry of the following remarks and reconsideration of the subject application. Applicant respectfully requests entry of the amendments herein. The remarks and amendments should be entered under 37 C.F.R. §1.116 as they place the application in better form for appeal, or for resolution on the merits.

Applicant respectfully requests reconsideration and allowance of all of the pending claims of the application. Herein, claims 1-6, 8-24, 26-41, and 43-48 are pending. Claims amended: 1, 2, 24, 30, 33, 36, 40, and 43. Claims canceled or withdrawn: 7, 25, and 42. Claims added: none

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Formal Objections

Claim Objection

The Office objected to claim 40 because it uses the word "commend" rather than "command." Applicant amends this claim to correct accordingly.

SUBSTANTIVE CLAIM REJECTIONS

Claim Rejections under §§ 102 and 103

The Office rejects all pending claims under §102 and §103. For the reasons set forth below, the Office has not shown that the cited reference(s) anticipate (i.e., §102) the recited claims. For the reasons set forth below, the Office has not made out a *prima facie* case of obviousness (i.e., §103). Accordingly, Applicant respectfully requests that the rejections be withdrawn and the case be passed along to issuance.

The Office's rejections are based upon one or more of the following references:

- **Gunningberg**: *Gunningberg et al.*, "How a Large ATM MTU Causes Deadlocks in TCP Data Transfers", IEEE/ACM Transactions on Networking, Vol. 3, Issues 4, (1995);
- **Munger**: *Munger et al.*, US Patent No. 6,502,135;
- **Khali**: *Khalil et al.*, "Performance Considerations for TCP/IP in Wide Area Networks", IEEE (1994).

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Overview of the Application

The application describes techniques for fast dynamic measurement of bandwidth in a TCP network environment that utilizes a single pair of packets (i.e., a "packet pair") to calculate bandwidth between two entities on a network (such as the Internet).

On its journey across a network, packet pairs may be delayed by communication devices. In particular, TCP networks have two algorithms designed to delay some packets with the goal of increasing the overall *throughput* of the network. However, these algorithms effectively delay a packet pair designed to quickly measure bandwidth. Therefore, these algorithms distort the measurement. These algorithms are "Nagle" and "Slow Start."

The Nagle Algorithm was designed to avoid problems with small TCP segments (sometimes called "tinygrams") on slow networks. With this algorithm active, communications devices on a network will introduce a 200 milliseconds (msec) delay under specific circumstances:

Setting TCP_NODELAY on the socket of the sending side deactivates the Nagle Algorithm. All data sent will go immediately, no matter what the data size.

The "Slow Start" algorithm dampens the jack-rabbit start of the initial connection of TCP network devices. Doing this improves the overall throughput. It operates by observing that the rate at which new packets should be injected into the network is the rate at which the acknowledgments are returned by the other end. These acknowledgements delay the initial start of the communication between two entities on a network

The application is directed to techniques for measuring bandwidth, where such techniques implement countermeasures to overcome the delays.

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Furthermore, such techniques are implemented in the application layer of the OSI model.

Typically, an application (at the application layer) has limited control over the handling of TCP packets. Thus, conventional bandwidth measurements avoid application-level TCP bandwidth measurements.

The integrity of the packet pair technique requires that at least two packets be sent back-to-back. However, these packets may not arrive in such a manner because of the affects of the Nagle Algorithm and the Slow Start Algorithm. This discourages the use of the packet-pair technique for bandwidth measurement over a TCP network.

Conventional bandwidth measurement approaches are typically implemented the transport layer or some other layer below the application level. However, this Application describes a technology that is implemented at the application layer. There are at least two major benefits to such an application-level approach to TCP packet-pair bandwidth measurement.

First, a lower level (such as transport level) packet-pair implementation is disfavored. It requires changes to the kernel of the OS and it does not lend itself easily to incremental deployment. As opposed to an application-level implementation, a lower packet-pair implementation involves greater expense in development, initial deployment, future development, and future deployment.

Second, according to one study, only a quarter of the TCP connections studied would benefit from a bandwidth measurement. Therefore, it is not cost effective to implement such bandwidth measurement at a lower level if it only used no more than a quarter of the connections. Therefore, such bandwidth measurement is best to be included in the applications that applications that need

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it. Applications are much easier (and less expensive) to incrementally deploy than a new kernel of the operating system.

Gunningberg

The Office cites Gunningberg in its anticipation rejections. Also, Gunningberg is the primary reference cited in the Office's obviousness rejections.

Gunningberg investigates a problem, described as "deadlock." At p. 410, col.1, ¶ 2, Gunningberg says, "This paper explains the causes of deadlocks and discusses some of the means for solving the underlying problems." Gunningberg messages throughput under various conditions (such as those shown in Table II of p. 416.

In its experiments, Gunningberg never discusses a practical implementation of its throughput measurements. Consequently, it never mentions what layer of the OSI model performs such measurement.

In addition, in its experiments, Gunningberg sends multiple sets of packets to measure throughput. For example, on p. 417, first paragraph, Gunningberg says that it sends "100 consecutive RPC calls" and uses the "measured average response time" of that 100 calls. Therefore, it does not use the packet-pair technique that is discussed by the Application.

Furthermore, in its experiments, Gunningberg offers no discussion regarding the acceptability or tolerability of any experimentally measured delay between RPCs.

Moreover, Gunnigberg does not disclose the use of a "push" data segment will effectively "push" any previously sent segment.

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In subsection III.E on page 415, Gunningberg discloses sending another ($S_{byte} - b_{byte}$) bytes in a transmission **only if** ($S_{byte} - b_{byte}$) ≥half of the maximum advertised window size (R). On page 415, col. 2, lines 3-5, Gunningberg indicates that given this condition, a segment of ($S_{byte} - b_{byte}$) bytes will be transmitted independent of the Nagle Algorithm.

Other than size of data in the advertised window, Gunningberg does not disclose any relationship or conditions between the ($S_{byte} - b_{byte}$) segment and any previously sent segments. Furthermore, Gunningberg does not indicate that sending the ($S_{byte} - b_{byte}$) segment will effectively "push" any previously sent segments.

Anticipation Rejections

Based on Gunningberg

The Office has rejected claims 1-6, 8, 9, 16, 20, 24-26, 28, 30-38 and 41 under 35 USC § 102(b) as being anticipated by Gunningberg. Applicant respectfully traverses the rejections of these claims. Based on the reasons given below, Applicant asks the Office to withdraw its rejection of these claims.

Claim 1

With the cited portions of Gunningberg in brackets, this amended claim recites:

- sending a delay-disable command; **[Gunningberg: p. 411, col. 2, 2nd ¶, lines 8-13]**

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- sending a set of packets from a sending entity to a receiving entity **[Gunningberg: p. 416, col. 2, lines 56-63]**;
- wherein both sendings are performed at an application layer of a computer in accordance with an OSI model **[Munger: col. 4, lines 1-15]**.

As amended herein, this claim incorporates the feature of the now canceled claim 7. Specifically, it now specifies that the two "sendings" are "performed at an application layer of a computer in accordance with an OSI model."

In a later obviousness rejection of claim 7, the Office admits that Gunningberg fails to disclose this feature. However, it relies on Munger to supply the missing disclosure and it recites col. 4, lines 1-15 for support. That text is reproduced here:

> To transmit a data stream, a TARP originating terminal constructs a series of TARP packets from a series of IP packets generated by a network (IP) layer process. (Note that the terms "network layer," "data link layer," "application layer," etc. used in this specification correspond to the Open Systems Intercomection (OSI) network terminology.) The payloads of these packets are assembled into a block and chain-block encrypted using the session key. This assumes, of course, that all the IP packets are destined for the same TARP terminal. The block is then interleaved and the interleaved encrypted block is broken into a series of payloads, one for each TARP packet to be generated. Special TARP headers IPT are then added to each payload using the IP headers from the data stream packets. The TARP headers can be identical to normal IP headers or customized in some way.

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While Munger does mention the OSI model and the "application layer," it never indicates that any action or operation that it is doing is performed at this layer.

As indicated in the Application, conventional bandwidth measurement approaches are typically implemented the transport layer or some other layer below the application layer. However, this claim, as now amended, recites performance at the application layer.

There are at least two major benefits to such an application-level approach to TCP packet-pair bandwidth measurement.

- First, a lower level (such as transport level) packet-pair implementation requires changes to the kernel of the OS and it does not lend itself easily to incremental deployment. As opposed to an application-level implementation, a lower packet-pair implementation involves greater expense in development, initial deployment, future development, and future deployment.
- Second, according to one study, only a quarter of the TCP connections studied would benefit from a bandwidth measurement. Therefore, it is not cost effective to implement such bandwidth measurement at a lower level if it only used no more than a quarter of the connections. Therefore, such bandwidth measurement is best to be included in the applications that applications that need it. Applications are much easier (and less expensive) to incrementally deploy than a new kernel of the operating system.

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Furthermore, Applicant submits that the Office has not shown any objective evidence in Gunningberg or Munger that would motivate one of ordinary skill in the art at the time of the invention (OOSA) to combine the teaching of the references.

Therefore, the Applicant submits that Gunningberg fails to disclose the claimed arrangements of the elements and features of this claims. It has also not shown that the combination of Gunningberg and Munger discloses the claimed arrangement nor has it shown any objective evidence in the cited references that would lead OOSA to combine their teachings. Accordingly, Applicant asks the Office to withdraw its rejection of this claims.

Claims 2-6, 8, and 39

These claims ultimately depend upon independent claim 1. As discussed above, claim 1 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Claim 30

With the cited portions of Gunningberg in brackets, this amended claim recites:

- sending a delay-disable command; **[Gunningberg: p. 411, col. 2, 2nd ¶, lines 8-13]**

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- sending a set of packets from a sending entity to a receiving entity **[Gunningberg: p. 416, col. 2, lines 56-63]**;
- wherein the set of packets consists of two packets sent back-to-back and wherein both sendings are performed at an application layer of the computer in accordance with an OSI model **[Munger: col. 4, lines 1-15]**.

As amended herein, this claim incorporates two new features. Specifically, it now specifies that the two "sendings" are "performed at an application layer of a computer in accordance with an OSI model." Furthermore, it now specifies that set of packets "consists of two packets sent back-to-back."

In a later obviousness rejection of claim 7, the Office admits that Gunningberg fails to disclose this "application layer" feature. However, it relies on Munger to supply the missing disclosure and it recites col. 4, lines 1-15 for support. That text is reproduced here:

> To transmit a data stream, a TARP originating terminal constructs a series of TARP packets from a series of IP packets generated by a network (IP) layer process. (Note that the terms "network layer," "data link layer," "application layer," etc. used in this specification correspond to the Open Systems Intercomection (OSI) network terminology.) The payloads of these packets are assembled into a block and chain-block encrypted using the session key. This assumes, of course, that all the IP packets are destined for the same TARP terminal. The block is then interleaved and the interleaved encrypted block is broken into a series of payloads, one for each TARP packet to be generated. Special TARP headers IPT are then added to each payload using the IP headers from the data stream packets. The TARP headers can be identical to normal IP headers or customized in some way.

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While Munger does mention the OSI model and the "application layer," it never indicates that any action or operation that it is doing is performed at this layer.

As indicated in the Application, conventional bandwidth measurement approaches are typically implemented the transport layer or some other layer below the application layer. However, this claim, as now amended, recites performance at the application layer. The application layer has many benefits discuss above in the response to the rejection of claim 1.

Furthermore, Applicant submits that the Office has not shown any objective evidence in Gunningberg or Munger that would motivate one of ordinary skill in the art at the time of the invention (OOSA) to combine the teaching of the references.

Regarding the use of "two packets sent back-to-back": In its experiments, Gunningberg sends multiple sets of packets to measure throughput. For example, on p. 417, first paragraph, Gunningberg says that it sends "100 consecutive RPC calls" and uses the "measured average response time" of that 100 calls. Therefore, it does not use the packet-pair technique that is discussed by the Application.

This claim specifically recites, "the set of packets consists of two packets sent back-to-back." Applicant uses the term "consists of" and not "comprising." The measurement technique discloses by Gunningberg consists of "100 consecutive" packets—not just two.

Therefore, the Applicant submits that Gunningberg fails to disclose the claimed arrangements of the elements and features of this claims. It has also not shown that the combination of Gunningberg and Munger discloses the claimed arrangement nor has it shown any objective evidence in the cited references that

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would lead OOSA to combine their teachings. Accordingly, Applicant asks the Office to withdraw its rejection of this claims.

Claims 9 and 31

With the cited portions of Gunningberg in brackets, these unamended claims recite:

- sending a set of packets from a sending entity to a receiving entity, wherein a transmission delay between packets in the set is intolerable; **[p. 416, col. 2, lines 56-63]**
- immediately thereafter, sending at least one "push" packet to avert a transmission delay between packets in the set, wherein the delay is caused by packet buffering of a communication device on the network. **[p. 415, col. 1 and 2, which is a sub-section titled "Boundary Effects."]**

In Applicant's response to this rejection in the previous Action, Applicant wrote:

> At subsection IV.A on pages 416-417, Gunningberg describes an experiment to show the deadlock problem would cause a delay of up to 200 ms. To produce conditions when the deadlock would occur, each experiment was performed directly after the preceding one. In this experiment, there is no discussion regarding the tolerability of any experimentally measured delay between RPCs.
>
> At subsection III.E on page 415, Gunningberg discloses sending of an extra ($S_{byte} - b_{byte}$) bytes **only if** ($S_{byte} - b_{byte}$) ≥half of the maximum advertised window size (R). However, the purpose of this extra segment is merely to send as much data within a defined window size as possible. Nothing is mentioned about this extra segment having any form of affect on previously sent segments.
>
> Furthermore, on page 415, col. 2, lines 3-5, Gunningberg indicates that given this condition (when ($S_{byte} - b_{byte}$) ≥half R), a segment of ($S_{byte} - b_{byte}$) bytes will be transmitted and this transmission is independent of the Nagle Algorithm.

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Other than size of data in the advertised window, Gunningberg does not disclose any relationship or conditions between the ($S_{byte} - b_{byte}$) segment and any previously sent segments. Furthermore, Gunningberg does not indicate that sending the ($S_{byte} - b_{byte}$) segment will effectively "push" any previously sent segments.

Applicant asks the Office to point to the precise location of the language that discloses this feature in Gunningberg.

Applicant respectfully submits that Gunningberg does not disclose the claimed arrangements of the elements and features of these claims. In particular, Gunningberg fails to disclose that a "transmission delay between packets [] is intolerable" and it fails to disclose the sending of "at least one 'push' packet to avert a transmission delay between packets."

Instead, the extra ($S_{byte} - b_{byte}$) segment of Gunningberg is sent when the extra segment itself may be transmitted without delay. Applicant submits that this does not "avert a transmission delay between" packets that were previously sent. Furthermore, Gunningberg does not disclose the sending of such a "push" packet "immediately []after" the sending packets...."

In response to that, the Office indicated the following in this Action:

> ...[Gunningberg] teaches sending packets directly without delay independent of Nagle Algorithm if the packet satisfies the condition of $S_{byte} - b_{sent}$ is less than half the maximum advertised window R and therefore any packet that satisfies the relation is considered as a Push packet. [Gunningberg] also teaches sending a PUSH packet to empty the data segments to be transmitted (see col. 1 lines 50-67 on page 411).

Applicant submits that the Office has not shown where Gunningberg discuses the tolerability of any experimentally measured delay between packets. Indeed, in the discussion in subsection IV.A on pages 416-417, Gunningberg focuses solely on amount of data sent/received. It focuses on the size of the Receive socket buffer (R) and the size of the Send socket buffer (S). Not only is there no discussion here on any delay between packets, there is no indication that more than one packet in a set is sent.

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Yes, Gunningberg measures RPC response time. But the simple act of measuring response time no more indicates tolerability of such response time than does simple act of weighing an animal indicates whether it is or is not overweight. More is needed.

Some intelligence is needed to determine whether an animal is overweight based, at least in part, on its measured weight. Otherwise, it is just a measurement with no particular value.

Similarly, without some decision regarding the tolerability of a measured response time, Gunningberg's experimental measurements are just numbers with no particular value.

These claims recite, "wherein a transmission delay between packets in the set is intolerable." Since Gunningberg does not disclose this, it does not anticipate these claims.

In addition, the Office indicates that "any packet that satisfies the [condition of $S_{byte} - b_{sent}$ is less than half the maximum advertised window R] is considered as a Push packet." The Office does not explain who considers them to be "push" packets and why one would consider them so.

These claims recite that the purpose of "sending at least one 'push' packet" is to "avert a transmission delay between packets in the set, wherein the delay is caused by packet buffering of a communication device on the network."

As noted above, this subsection of Gunningberg does not discuss any delay between packets in a set. Consequently, it also does not discuss that the delay is "caused by packet buffering of a communication device on the network."

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Therefore, the Applicant submits that Gunningberg fails to disclose the claimed arrangements of the elements and features of these claims. Accordingly, Applicant asks the Office to withdraw its rejection of these claims.

Claims 10-15

These claims ultimately depend upon independent claim 9. As discussed above, claim 9 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Claims 16 and 32

With the cited portions of Gunningberg in brackets, these unamended claims recite:

> sending a set of packets from a sending entity to a receiving entity, wherein a transmission delay between packets in the set is intolerable; **[p. 416, col. 2, lines 56-63]**
>
> immediately before, sending at least one "priming" packet to avoid a transmission delay between packets in the set, wherein the delay is caused by flow-control functions of a communication device on the network. **[p. 410, col. 2, lines 61-67]**

To produce conditions when the deadlock would occur, each experiment to measure the delay between back-to-back RPCs is documented by Gunningberg in

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subsection IV.A on pages 416-417. There is no discussion regarding the acceptability or tolerability of any experimentally measured delay between RPCs.

Applicant references the weighing-an-animal analogy above on p. 29 above.

Unlike Gunningberg, the claim language describes a method that acts upon a determination that a "transmission delay between packets in the set is intolerable."

Furthermore, Gunningberg does not disclose the use of a "priming" data segment that will effectively "prime" a set of packets sent immediately before.

The Office indicates the following in this Action:

> ...[Gunningberg] teaches sending data packets one at a time through the connection. Gunningberg teaches sending multiple data packets and therefore the first packet that is sent through the connection is considered as a "prime" packet (see page 410, col. 2, lines 61-67). There is no limitation on the time the prime packet is sent before the back-to-back packets and therefore Gunningberg meets the scope of the claimed limitation "priming" packet.).

The Office indicates that the first of a set of potentially 100 packets is "considered as a 'prime' packet." However, it does not explain who considers it so and why one would consider it so.

According to the claims, the purpose of the "priming" packet is to "avoid a transmission delay between packets in the set." The Office does not explain how the first packet of a set of possibly 100 is one that is designed to "avoid a transmission delay between packets in the set." The packets in Gunningberg are merely part of an experiment and do not achieve these goals.

Accordingly, Applicant asks the Office to withdraw its rejection of these claims.

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Claims 17-23

These claims ultimately depend upon independent claim 16. As discussed above, claim 16 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Claim 24

With the cited portions of Gunningberg in brackets, this amended claim recites:

> sending a delay-disable command; **[page 411, col. 2, 2nd ¶, lines 8-13]**
>
> sending a pair of bandwidth-measurement packets from a sending entity to a receiving entity; **[page 416, col. 2, lines 56-63]**
>
> receiving a bandwidth calculation based upon measurements related to just the pair of bandwidth-measurement packets and not based upon measurements using any other packets.

Applicant respectfully submits that Gunningberg does not disclose "receiving a bandwidth calculation based upon measurements related to just the

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pair of bandwidth-measurement packets and not based upon measurements using any other packets."

Instead, in its experiments, Gunningberg sends multiple packets (3 or more) in a set to measure throughput. For example, on p. 417, first paragraph, Gunningberg says that it sends "100 consecutive RPC calls" and uses the "measured average response time" of that 100 calls. Therefore, it does not use "just the pair of bandwidth-measurement packets" recited in this claim.

Therefore, the Applicant submits that Gunningberg fails to disclose the claimed arrangements of the elements and features of this claim. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

Claim 40

This claim ultimately depends upon independent claim 24. As discussed above, claim 24 is allowable.

In addition to its own merits, this dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of this dependent claim because its base claim is allowable.

Claim 26

Claim 26 recites (with the portions of Gunningberg cited by the Office in the brackets):

> sending a pair of bandwidth-measurement packets from a sending entity to a receiving entity, wherein a transmission delay

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between packets in the pair is intolerable; [page 416, col. 2, lines 56-63]

immediately thereafter, sending at least one "push" packet to avert a transmission delay between packets in the pair, wherein the delay is caused by packet buffering of a communication device on the network. [page 415, col. 1 and 2, which is a sub-section titled "Boundary Effects."]

In Applicant's response to this rejection in the previous Action, Applicant wrote:

> To produce conditions when the deadlock would occur, each experiment to measure the delay between back-to-back RPCs is documented by Gunningberg in subsection IV.A on pages 416-417. There is no discussion regarding the acceptability or tolerability of any experimentally measured delay between RPCs.
>
> Furthermore, Gunningberg does not disclose the use of a "push" data segment will effectively "push" any previously sent segment.
>
> At subsection III.E on page 415, Gunningberg discloses sending an additional package of date of size ($S_{byte} - b_{byte}$) bytes only if ($S_{byte} - b_{byte}$) ≥half of the maximum advertised window size (R). On page 415, col. 2, lines 3-5, Gunningberg indicates that given this condition, a segment of ($S_{byte} - b_{byte}$) bytes will be transmitted independent of the Nagle Algorithm.
>
> Other than size of data in the advertised window, Gunningberg does not disclose any relationship or conditions between the ($S_{byte} - b_{byte}$) segment and any previously sent segments. Furthermore, Gunningberg does not indicate that sending the ($S_{byte} - b_{byte}$) segment will effectively "push" any previously sent segments.
>
> If Applicant is wrong, then Applicant asks the Office to point to the precise location of the language that discloses this feature in Gunningberg.
>
> Applicant respectfully submits that Gunningberg does not disclose the claimed arrangements of the elements and features of this claim. In particular, Gunningberg fails to disclose that a "transmission delay between packets [] is intolerable" and it fails to disclose the sending of "at least one 'push' packet to avert a transmission delay between packets."
>
> Instead, the ($S_{byte} - b_{byte}$) segment of Gunningberg is sent when the segment itself may be transmitted without delay. Applicant submits that this does not "avert a transmission delay between" packets that were previously sent. Furthermore, Gunningberg does not disclose the sending of such a "push" packet "immediately []after" the sending packets...."

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In response to that, the Office indicated the following in this Action:

> ...[Gunningberg] teaches sending packets directly without delay independent of Nagle Algorithm if the packet satisfies the condition of $S_{byte} - b_{sent}$ is less than half the maximum advertised window R and therefore any packet that satisfies the relation is considered as a Push packet. [Gunningberg] also teaches sending a PUSH packet to empty the data segments to be transmitted (see col. 1 lines 50-67 on page 411).

Applicant submits that the Office has not shown where Gunningberg discuses the tolerability of any experimentally measured delay between packets. Indeed, in the discussion in subsection IV.A on pages 416-417, Gunningberg focuses solely on amount of data sent/received. It focus on the size of the Receive socket buffer (R) and the size of the Send socket buffer (S). Not only is there no discussion here on any delay between packets, there is no indication that more than one packet in a set is sent.

Applicant references the weighing-an-animal analogy above on p. 29 above.

This claim recites, "wherein a transmission delay between packets in the set is intolerable." Since Gunningberg does not disclose this, it does not anticipate this claim.

In addition, the Office indicates that "any packet that satisfies the [condition of $S_{byte} - b_{sent}$ is less than half the maximum advertised window R] is considered as a Push packet." The Office does not explain who considers them to be "push" packets and why one would consider them so.

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This claim recites that the purpose of "sending at least one 'push' packet" is to "avert a transmission delay between packets in the pair, wherein the delay is caused by packet buffering of a communication device on the network."

As noted above, this subsection of Gunningberg does not discuss any delay between packets in a pair. Consequently, it also does not discuss that the delay is "caused by packet buffering of a communication device on the network."

Therefore, the Applicant submits that Gunningberg fails to disclose the claimed arrangements of the elements and features of this claim. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

Claim 27

This claim ultimately depends upon independent claim 26. As discussed above, claim 26 is allowable.

In addition to its own merits, this dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of this dependent claim because its base claim is allowable.

Claim 28

Claim 28 recites (with the portions of Gunningberg cited by the Office in the brackets):

> sending a pair of bandwidth-measurement packets from a sending entity to a receiving entity, wherein a transmission delay between packets in the pair is intolerable; **[page 416, col. 2, lines 56-63]**

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> immediately before, sending at least one "priming" packet to avoid a transmission delay between packets in the pair, wherein the delay is caused by flow-control functions of a communication device on the network. **[page 410, col. 2, lines 61-67]**

To produce conditions when the deadlock would occur, each experiment to measure the delay between back-to-back RPCs is documented by Gunningberg in subsection IV.A on pages 416-417. There is no discussion regarding the acceptability or tolerability of any experimentally measured delay between RPCs.

Applicant references the weighing-an-animal analogy above on p. 29 above.

Unlike Gunningberg, the claim language describes a method that acts upon a determination that a "transmission delay between packets in the set is intolerable."

Furthermore, Gunningberg does not disclose the use of a "priming" data segment that will effectively "prime" a set of packets sent immediately before.

The Office indicates the following in this Action:

> ...[Gunningberg] teaches sending data packets one at a time through the connection. Gunningberg teaches sending multiple data packets and therefore the first packet that is sent through the connection is considered as a "prime" packet (see page 410, col. 2, lines 61-67). There is no limitation on the time the prime packet is sent before the back-to-back packets and therefore Gunningberg meets the scope of the claimed limitation "priming" packet.).

The Office indicates that the first of a set of potentially 100 packets is "considered as a 'prime' packet." However, it does not explain who considers it so and why one would consider it so.

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According to the claim, the purpose of the "priming" packet is to "avoid a transmission delay between packets in the set." The Office does not explain how the first packet of a set of possibly 100 is one that is designed to "avoid a transmission delay between packets in the set." The packets in Gunningberg are merely part of an experiment and do not achieve these goals.

Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

Claim 29

This claim ultimately depends upon independent claim 28. As discussed above, claim 28 is allowable.

In addition to its own merits, this dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of this dependent claim because its base claim is allowable.

Claim 33

Claim 33 recites (with the portions of Gunningberg cited by the Office in the brackets):

> a transmission-delay avoider operating at an application layer in accordance with an OSI model and executable on the processor to:
>
> send a delay-disable command; **[page 411, col. 2, 2nd ¶, lines 8-13]**
>
> send a set of packets from a sending entity to a receiving entity **[page 416, col. 2, lines 56-63]**, the set of packets consists of two packets sent back-to-back.

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This claim recites that its transmission-delay avoider operates at "an application layer in accordance with an OSI model." In response to the rejection of claim 1 above, Applicant discusses that this feature is not disclosed in Gunningberg alone or in combination with Munger.

Therefore, the Applicant submits that Gunningberg fails to disclose the claimed arrangements of the elements and features of this claims. It has also not shown that the combination of Gunningberg and Munger discloses the claimed arrangement nor has it shown any objective evidence in the cited references that would lead OOSA to combine their teachings. Accordingly, Applicant asks the Office to withdraw its rejection of this claims.

Furthermore, this claim recites, "the set of packets consists of two packets sent back-to-back." As claimed, the set consists of two and only two packets.

Instead just sending two packets, in its experiments, Gunningberg sends multiple packets (3 or more) in a set to measure throughput. For example, on p. 417, first paragraph, Gunningberg says that it sends "100 consecutive RPC calls" and uses the "measured average response time" of that 100 calls. Therefore, it does not use a "set of packets consists of two packets sent back-to-back" as recited in this claim.

Therefore, the Applicant submits that Gunningberg fails to disclose the claimed arrangements of the elements and features of this claim. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

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Claim 34

Claim 34 recites (with the portions of Gunningberg cited by the Office in the brackets):

> send a set of packets from a sending entity to a receiving entity, wherein a transmission delay between packets in the set is intolerable; **[page 416, col. 2, lines 56-63]**
>
> immediately thereafter, send at least one "push" packet to avert a transmission delay between packets in the set, wherein the delay is caused by packet buffering of a communication device on the network. **[page 415, col. 1 and 2, which is a sub-section titled "Boundary Effects."]**

Applicant submits that the Office has not shown where Gunningberg discuses the tolerability of any experimentally measured delay between packets. Indeed, in the discussion in subsection IV.A on pages 416-417, Gunningberg focuses solely on amount of data sent/received. It focus on the size of the Receive socket buffer (R) and the size of the Send socket buffer (S). Not only is there no discussion here on any delay between packets, there is no indication that more than one packet in a set is sent.

Applicant references the weighing-an-animal analogy above on p. 29 above.

This claim recites, "wherein a transmission delay between packets in the set is intolerable." Since Gunningberg does not disclose this, it does not anticipate this claim.

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In addition, the Office indicates that "any packet that satisfies the [condition of $S_{byte} - b_{sent}$ is less than half the maximum advertised window R] is considered as a Push packet." The Office does not explain who considers them to be "push" packets and why one would consider them so.

This claim recites that the purpose of "sending at least one 'push' packet" is to "avert a transmission delay between packets in the pair, wherein the delay is caused by packet buffering of a communication device on the network."

As noted above, this subsection of Gunningberg does not discuss any delay between packets in a pair. Consequently, it also does not discuss that the delay is "caused by packet buffering of a communication device on the network."

Therefore, the Applicant submits that Gunningberg fails to disclose the claimed arrangements of the elements and features of this claim. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

Claim 35

Claim 35 recites (with the portions of Gunningberg cited by the Office in the brackets):

> send a pair of bandwidth-measurement packets from a sending entity to a receiving entity, wherein a transmission delay between packets in the pair is intolerable; **[page 416, col. 2, lines 56-63]**
>
> immediately before, send at least one "priming" packet to avoid a transmission delay between packets in the pair, wherein the delay is caused by flow-control functions of a communication device on the network .**[page 410, col. 2, lines 61-67]**

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To produce conditions when the deadlock would occur, each experiment to measure the delay between back-to-back RPCs is documented by Gunningberg in subsection IV.A on pages 416-417. There is no discussion regarding the acceptability or tolerability of any experimentally measured delay between RPCs.

Applicant references the weighing-an-animal analogy above on p. 29 above.

Unlike Gunningberg, the claim language describes a method that acts upon a determination that a "transmission delay between packets in the set is intolerable."

Furthermore, Gunningberg does not disclose the use of a "priming" data segment that will effectively "prime" a set of packets sent immediately before.

The Office indicates the following in this Action:

> ...[Gunningberg] teaches sending data packets one at a time through the connection. Gunningberg teaches sending multiple data packets and therefore the first packet that is sent through the connection is considered as a "prime" packet (see page 410, col. 2, lines 61-67). There is no limitation on the time the prime packet is sent before the back-to-back packets and therefore Gunningberg meets the scope of the claimed limitation "priming" packet.).

The Office indicates that the first of a set of potentially 100 packets is "considered as a 'prime' packet." However, it does not explain who considers it so and why one would consider it so.

According to the claim, the purpose of the "priming" packet is to "avoid a transmission delay between packets in the set." The Office does not explain how the first packet of a set of possibly 100 is one that is designed to "avoid a

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transmission delay between packets in the set." The packets in Gunningberg are merely part of an experiment and do not achieve these goals.

Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

Claim 36

Claim 36 recites (with the portions of Gunningberg cited by the Office in the brackets):

> a first field including a delay-disable command; **[p. 411, col. 2, 2nd ¶, lines 8-13]**
>
> a second field including a first bandwidth-measurement packet;
>
> a third field including a second bandwidth-measurement packet. **[Table II, Fig. 9, and page 416, col. 2, lines 56-67 and page 417, col. 1, 1st ¶]**

As amended, this claim now indicates that the modulated data signal "consists of" the three fields recited in this claim. Therefore, since (as discussed above) Gunningberg discloses use of a 100 of "fields" containing packets or commands, Gunningberg does not disclose a signal with just the three fields recited in this claim.

Therefore, the Applicant submits that Gunningberg fails to disclose the claimed arrangements of the elements and features of this claim. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

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Claims 37

Claim 37 recites (with the portions of Gunningberg cited by the Office in the brackets):

> a first field including a first bandwidth-measurement packet;
>
> a second field including a second bandwidth-measurement packet; **[Table II, Fig. 9, and page 416, col. 2, lines 56-67 and page 417, col. 1, 1st ¶]**
>
> a third field including a "push" packet facilitating minimization of transmission delay between the first and second packets, wherein the delay is caused by packet buffering of a communication device on the network. **[p. 415, col. 1 and 2, which is a sub-section titled "Boundary Effects."]**

The Office indicates that "any packet that satisfies the [condition of $S_{byte} - b_{sent}$ is less than half the maximum advertised window R] is considered as a Push packet." The Office does not explain who considers them to be "push" packets and why one would consider them so.

This claim recites that the purpose of the "third field including a 'push' packet" is to "facilitate minimization of transmission delay between the first and second packets, wherein the delay is caused by packet buffering of a communication device on the network."

As noted above, this subsection of Gunningberg does not discuss any delay between packets in a pair. Consequently, it also does not discuss that the delay is "caused by packet buffering of a communication device on the network."

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Therefore, the Applicant submits that Gunningberg fails to disclose the claimed arrangements of the elements and features of this claim. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

Claim 38

Claim 38 recites (with the portions of Gunningberg cited by the Office in the brackets):

> first field including a "priming" packet; **[page 410, col. 2, lines 61-67]**
>
> a second field including a first bandwidth-measurement packet;
>
> a third field including a second bandwidth-measurement packet;
>
> wherein the "priming" packet facilitates minimization of transmission delay between packets, wherein the delay is caused by flow-control functions of a communication device on the network. **[Table II, Fig. 9, and page 416, col. 2, lines 56-67 and page 417, col. 1, 1st ¶. And page 410, col. 2, lines 61-67]**

Gunningberg does not disclose the use of a "priming" packet that will "facilitates minimization of transmission delay between packets, wherein the delay is caused by flow-control functions of a communication device on the network."

The Office indicates the following in this Action:

> ...[Gunningberg] teaches sending data packets one at a time through the connection. Gunningberg teaches sending multiple data packets and

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> therefore the first packet that is sent through the connection is considered as a "prime" packet (see page 410, col. 2, lines 61-67). There is no limitation on the time the prime packet is sent before the back-to-back packets and therefore Gunningberg meets the scope of the claimed limitation "priming" packet.).

The Office indicates that the first of a set of potentially 100 packets is "considered as a 'prime' packet." However, it does not explain who considers it so and why one would consider it so.

According to the claim, the purpose of the "priming" packet is to "facilitates minimization of transmission delay between packets." The Office does not explain how the first packet of a set of possibly 100 is one that is designed to "facilitates minimization of transmission delay between packets." The packets in Gunningberg are merely part of an experiment and do not achieve these goals.

Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

Claim 41

Claim 41 recites (with the portions of Gunningberg cited by the Office in the brackets):

- sending a delay-disable command to direct a disablement of a communications delay imposed by one or more communication devices on a communications network; **[p. 411, col. 2, 2nd ¶, lines 8-13]**
- while the communications delay is disabled, sending a set of packets from a sending entity to a receiving entity **[p. 416, col. 2, lines 56-63**, wherein the set of packets consists of two packets sent back-to-back.

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As amended, this claim now indicates that the set of packets which are the subject of the action of this method "consists of two packets sent back-to-back." Therefore, since (as discussed above) Gunningberg discloses sending a 100 packets to perform a measurement, Gunningberg does not disclose a method that acts on a set that just "consists of" two packets, as recited in this claim.

Therefore, the Applicant submits that Gunningberg fails to disclose the claimed arrangements of the elements and features of this claim. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

Claims 43-48

These claims ultimately depend upon independent claim 41. As discussed above, claim 41 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

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OBVIOUSNESS REJECTIONS

Based upon Gunningberg and Munger

The Office rejects claims 7 and 12 under USC § 103(a) as being unpatentable over Gunningberg and Munger. Applicant traverses this rejection. Reconsideration and allowance of these claims is respectfully requested.

Claim 7

This claim has been withdrawn because its features are largely incorporated into claim 1.

Claim 12

This claim ultimately depends upon independent claim 9. As discussed above, claim 9 is allowable.

In addition to its own merits, this dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of this dependent claim because its base claim is allowable.

Claim 21

This claim ultimately depends upon independent claim 16. As discussed above, claim 16 is allowable.

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In addition to its own merits, this dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of this dependent claim because its base claim is allowable.

General

The Office rejects claims 10, 11, 13-15, 17-19, 22, 23, 27, 29, 39, 40, and 42-48. However, the Office does not give any specific reasons for their rejection. Rather, the Office indicates that these claims "do not teach or define any anew limitation to claims 1-9, 16, 33, and 41 and therefore are rejected for similar reasons."

Applicant traverses this batch-style rejection and requests more specificity.

Regardless, these claims are ultimately dependent upon other base claims. As discussed above, their base claims are allowable.

In addition to its own merits, each dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

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Dependent Claims

In addition to its own merits, each dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each dependent claim where its base claim is allowable.

Conclusion

All pending claims are in condition for allowance. Applicant respectfully requests reconsideration and prompt issuance of the application. If any issues remain that prevent issuance of this application, the Office is urged to contact the undersigned attorney before issuing a subsequent Action.

Respectfully Submitted,

Dated: 6-21-04 By: _____

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